Environmental Research Seminar

Presented by
Regional Science Council of US EPA Region 6
US EPA Office of Research and Development STAR Program

US EPA, Region 6
1445 Ross Avenue
Dallas, TX

May 28, 2003
7:45 a.m. – 5:00 p.m.

FREE
Registration Information Inside

REGIONAL SCIENCE COUNCIL
Unlocking the Mysteries

NCER STAR
Science to Achieve Results

Seminar Overview

On May 28, 2003, twelve EPA Science to Achieve Results (STAR) grantees will present the results of their research to Region 6 managers and staff. The STAR Environmental Research Seminar, the first to be held in Dallas, is being modeled after the extremely successful pilot seminar held in Boston last November. STAR funds cutting-edge environmental research projects nationwide, with many focusing on specific needs of the regions. Out of the hundreds of possible choices, Region 6 chose topics related to air quality, drinking water, asthma, and other important issues related to work that is ongoing in the region. State environmental agency representatives will also be invited to attend this seminar, giving them and Region 6 a unique opportunity to learn about a variety of STAR research projects.

Each hour, attendees can choose from two speaker sessions. Don't miss this unique opportunity to hear from these twelve respected researchers and experts and learn about how their discoveries might have an impact on environmental science and policy making, your environmental program, your project, your state and your community.

Who Should Attend

Speakers and research projects were specifically selected to address the needs and interests of federal, state, and tribal environmental employees in EPA's Region 6. The purpose of this seminar is to educate and engage discussion between researchers and scientists from federal, state and tribal environmental programs of the latest state of the art in environmental research. The seminar also will give researchers in the region the opportunity to discuss their research in the context of US EPA environmental science needs and priorities.

Welcome!
From Conference Cosponsors and Guest Speakers

Region 6 is proud to be home to many nationally recognized institutions and individuals who are on the forefront of environmental science and research. We are equally proud to cosponsor this important seminar which will allow government policy makers, scientists, and program managers to learn from the region's premier environmental researchers in fields as varied as Region 6's landscape. I hope you will join us.

Mayor Richard Greene
Regional Administrator, US EPA Region 6

This workshop gives you the opportunity to interact with some of the area's leading scientists conducting research on issues of critical importance to your region. The STAR and EPSCoR grantees are an important part of EPA's research program and provide us with the nation's best scientists and engineers from both academic and nonprofit research centers. Please join us at this special event.

Dr. Paul Gilman
EPA Science Advisor and Assistant Administrator,
Office of Research and Development

We are proud to welcome the Administrator of the US Environmental Protection Agency

Governor Christine Todd Whitman

Agenda at a Glance

7:45 – 8:25	Check-in and Coffee
8:30 – 8:45	Mayor Richard Greene, *Regional Administrator, US Environmental Protection Agency, Region 6*
8:45 – 9:15	Governor Christine Todd Whitman, *Administrator, US Environmental Protection Agency*
9:15 – 9:30	Dr. Paul Gilman, *US EPA Science Advisor Assistant Administrator, Office of Research and Development US Environmental Protection Agency*
	Morning Break

Note: there is a 10 min. break between each session

10:00 – 10:50	Sessions 1 & 2	Chappell or Taylor
11:00 – 11:50	Sessions 3 & 4	Matlock or Phillips
12:00 – 1:00	Lunch (on your own)	
1:00 – 1:50	Sessions 5 & 6	Koziel or McManis
2:00 – 2:50	Sessions 7 & 8	Kibbey or Barrett
3:00 – 3:50	Sessions 9 & 10	Aravamuthan or Warner
4:00 – 4:50	Sessions 11 & 12	Henderson or Seimann
5:00	Adjourn	

10:00 – 10:50 Session 1 & 2 Chappell or Taylor

Cynthia L. Chappell, Ph.D.
Associate Professor of Biological Sciences and
Associate Dean for Academic Affairs
The University of Texas Health Science Center at Houston, School of Public Health

CRYPTOSPORIDIUM INFECTION IN HEALTHY ADULTS
Cryptosporidium is a common cause of diarrheal illness passed to humans through drinking water. The parasite has two major genotypes or strains with different transmission cycles and a wide variability in infection rates. A small set of volunteers was dosed and their diarrheal symptoms monitored and compared for 6 weeks. Researchers concluded that one specific genotype was highly infectious in healthy adults who also exhibited extended periods of infection. In addition, results indicated that other people can be infected by those with the disease and from environmental sources.

Henry F. Taylor, Ph.D.
Electrical Engineering Department
Texas A&M University

A FIBER-OPTIC SENSOR TO REDUCE HARMFUL EMISSIONS FROM AUTOMOBILE ENGINES
For the first time, researchers were able to measure the pressure in an internal combustion engine using a fiber-optic sensor embedded in a spark plug. In-cylinder gas pressure is the key input for engine-control systems designed to minimize emissions under all operating conditions. The transducer element, the fiber Fabry-Perot interferometer (FFPI), was developed at Texas A&M and commercialized by a small company, Fiber Dynamics, in 1994. Representing a radical departure from prior fiber-optic transducer designs, this type of sensor has a chance to meet a cost goal of less than $5 per cylinder while requiring very little space in the engine compartment. Data from in-cylinder engine pressure sensors such as these can make a significant contribution to reducing harmful emissions and improving the fuel economy of spark-ignited engines. Near-term goals are to prove the robustness and manufacturing of this fiber-optic sensor as a step towards future application in automotive engines.

11:00 – 11:50 Session 3 & 4 Matlock or Phillips

Marty D. Matlock, Ph.D., P.E.
Biological and Agricultural Engineering
University of Arkansas

DEVELOPING REHABILITATION METHODS FOR URBAN WATERSHEDS USING STAKEHOLDER FEEDBACK

Researchers developed and tested a method for restoring the ecological integrity of urban watersheds that combined ecology, engineering, and social sciences. They investigated whether risk-based models developed for agricultural, nonpoint source, pollution management could be applied to urban watersheds. They also worked with stakeholders to determine whether "collaborative learning intervention" would improve their understanding of nonpoint source pollution, systems thinking, using scientific information about TMDLs, and communication. Results indicated that with adequate quality control, risk-based watershed models could be applied to urban watersheds. Collaborative learning was an effective tool for developing stakeholder understanding of complex ecological processes.

Margaret Phillips, Ph.D., CIH
Associate Professor of Occupational and Environmental Health
University of Oklahoma Health Sciences Center

FACTORS DETERMINING PERSONAL EXPOSURE TO VOLATILE AIR TOXICS IN URBAN ENVIRONMENT: THE OKLAHOMA URBAN AIR TOXICS STUDY

Air sampling for volatile organic compounds (VOCs) was conducted in a total of 42 households in Stillwater, Ponca City, Oklahoma City, and Tulsa, to evaluate factors that might affect exposures to these compounds. Of the eleven VOCs measured in this study, only benzene, toluene, o-xylene and p-xylene were measured in a sufficient number of samples to support statistical analysis. The Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Level was exceeded in a small number of the samples. Personal and indoor concentrations tended to be higher than outdoor concentrations, indicating that indoor exposures were dominated by indoor sources. Although exposures were not higher in "tight" as compared to "leaky" houses, this suggests that indoor concentrations reflected very localized, short-term emissions inside the house. Indoor concentrations were also analyzed for relationships with factors such as large or small city, presence or absence of a refinery, wet or dry weather conditions, and presence or absence of children in the household. Surprisingly, some unexpected results were obtained (for example, higher indoor concentrations were associated with absence of a refinery); it is possible that these factors were confounded by some unmeasured household characteristics or activities that were the true determinants of exposure.

Attendee Registration for US EPA's Environmental Research Seminar

All information must be filled out completely. One name per form. Please make additional copies as needed.
For more information on this seminar contact Troy Stuckey at 214-665-6432 or Estella Waldman at 202-564-6836.
Registration also available onsite.

MAIL
Attn: H. Troy Stuckey, Ph.D.
US EPA Region 6 (6PD-P)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202

PRINT
extra forms
from our web site
www.epa.gov/earth1r6

Name _____

Title _____

Organization _____

Street _____

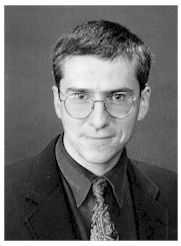
City _____ State _____ Zip _____

Phone _____ Fax _____ Email _____

Please check the boxes for the sessions you wish to attend:

☐	**Session 1**	Cryptosporidium Infection in Healthy Adults
☐	**Session 2**	A Fiber-optic Sensor to Reduce Harmful Emissions from Automobile Engines
☐	**Session 3**	Developing Rehabilitation Methods for Urban Watersheds Using Stakeholder Feedback
☐	**Session 4**	Factors Determining Personal Exposure to Volatile Air Toxics in Urban Environment: The Oklahoma Urban Air Toxics Study
☐	**Session 5**	Municipal Sewers as Sources of Hazardous Air Pollutants
☐	**Session 6**	Urban Waste Management and Research
☐	**Session 7**	The Influence of Surfactants on the Adsorption and Transport of Pharmaceuticals in the Subsurface
☐	**Session 8**	Role of Air Pollutant Exposures in the Development and Severity of Asthma
☐	**Session 9**	Modeling the Impacts of Climate Change on Wetland Ecosystems
☐	**Session 10**	Mercury and Fish in the Mobile Alabama River Basin: Linking Science with Land Use and Social Assessment
☐	**Session 11**	Use of a Battery of Biomarkers to Assess Exposure
☐	**Session 12**	Chinese Tallow Invasions into the Endangered Coastal Prairie: Causes and Consequences

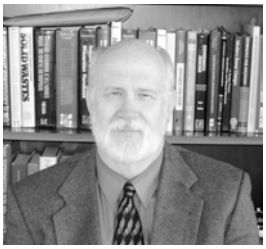
1:00 – 1:50 Session 5 & 6 Koziel or McManis



Jacek A. Koziel, Ph.D.
Texas Agricultural Experiment Station in Amarillo
Texas A&M University

MUNICIPAL SEWERS AS SOURCES OF HAZARDOUS AIR POLLUTANTS

This study involved three major tasks: conducting field experiments to assess the removal of volatile tracers from operating municipal sewers, using tracer data to evaluate existing models to predict volatile organic compound (VOC) removal from sewers, and developing a new modeling approach to predict VOC emissions from entire municipal sewer networks. For three sewers, results showed variable losses along each sewer reach. Steeper slopes in sewer reaches resulted in greater losses of volatile organic compounds. A model was developed using the results of these experiments and used to predict hazardous air pollutants for several cities in EPA, Region 6.



Kenneth McManis, Ph.D., P.E.
Director of Urban Waste Management Center
University of New Orleans

URBAN WASTE MANAGEMENT AND RESEARCH

Years of unprecedented urban growth have given way to the deterioration of an aging urban infrastructure. Trends in population and development indicate that by 2010 more than half of the people in the United States will live in coastal towns and cities. This increased population and the impact of urban growth on urban watersheds, urban air quality and needs for better municipal waste management will be significant. Unless strong measures are taken, sewer overflows and stormwater runoff from these rapidly growing areas will continue to degrade coastal waters and pollute our beaches. In addition, for many coastal metropolitan areas such as the major cities along the Gulf Coast, the geology and wet climate produces a high groundwater level requiring unique solutions. Research at the University of New Orleans' Urban Waste Management and Research Center has focused on studies involving storm sewer overflows and infiltration/inflow, municipal wastewater treatment, and issues associated with high groundwater and wet weather conditions.

2:00 – 2:50 Session 7 & 8 Kibbey or Barrett

Tohren Kibbey, Ph.D.
School of Civil Engineering and Environmental Science
University of Oklahoma

THE INFLUENCE OF SURFACTANTS ON THE ADSORPTION AND TRANSPORT OF PHARMACEUTICALS IN THE SUBSURFACE

Every year, thousands of tons of pharmaceutical products are produced for human and animal use, and significant quantities ultimately find their way into the environment. Although the concentrations of pharmaceuticals identified in the environment are typically low, the potential for long-term risks to human and ecological health are increasingly being recognized. The focus of this work is to evaluate the effects of surfactants and similar compounds or "amphiphiles" on the fate and transport of pharmaceuticals in the environment. Amphiphiles are widely used in pharmaceutical products and surfactants from detergents and other products are often present in wastewaters. All of these products enter the environment through wastewater discharges. Amphiphiles can have a profound effect on the fate and transport of many contaminants, including pharmaceuticals, by changing the properties of the soil surface, and through interactions in solution. This talk will discuss the results of initial experiments evaluating the effects of surfactants on the adsorption and transport of selected pharmaceutical compounds.

Ted Barrett, Ph.D.
Lovelace Respiratory Research Institute

ROLE OF AIR POLLUTANT EXPOSURES IN THE DEVELOPMENT AND SEVERITY OF ASTHMA

Approximately 17 million Americans suffer from asthma, the leading serious chronic illness in children. The medical community continues to be alarmed by the dramatic increase in the number of individuals, especially children, who suffer from asthma. While the exact cause(s) of the increase in asthma incidence are unknown, it is believed that exposure to air pollutants may play a role in the development and exacerbation of asthma. We have been using several different animal models to characterize the effects of diesel exhaust, wood smoke, cigarette smoke, and ultrafine carbon particle exposure on the development and severity of allergic responses in the lung. In general, results from these animal studies suggest that exposure can enhance the level of existing allergic inflammation in the lung and alter pulmonary function. Interestingly, however, we have found that the order of exposure to the allergen and diesel exhaust can have opposite effects on the allergic response. For example, diesel after allergen exposure yields exacerbation whereas diesel before allergen leads to attenuation. Further, results from these studies do not support the hypothesis that exposure to air pollutants can induce the development of allergic asthma.

3:00 – 3:50 Session 9 & 10 Aravamuthan or Warner

Vibhas Aravamuthan, Ph.D.
Department of Civil and Environmental Engineering
Louisiana State University

MODELING THE IMPACTS OF CLIMATE CHANGE ON WETLAND ECOSYSTEMS

The goal of this project is to develop a model to assess the impacts of climate change on the hydrology and ecology of Louisiana wetlands. The work involves the integration of a global climate model, an overland flow hydrologic model, a coastal hydrodynamic model, and a landscape ecology model. Although the model will be applied to Louisiana wetlands, it will not be site specific, and should be applicable to other regions with minimal effort. The climatological scenarios include global warming due to increased CO_2 emissions and sea level rise. The results of this study should be of interest to a broad spectrum of agencies and individual researchers who are involved in making scientific and management decisions regarding the protection, planning and restoration of wetlands.

Kimberly A. Warner, Ph.D.
Department of Biological Sciences; Center for Freshwater Studies
University of Alabama

MERCURY AND FISH IN THE MOBILE ALABAMA RIVER BASIN: LINKING SCIENCE WITH LAND USE AND SOCIAL ASSESSMENT

This study had two parts. The first was an investigation of both natural and human-imposed conditions in the Mobile-Alabama River Basin that might promote changing mercury into a form (methylmercury) that accumulates in fish and humans. Results show that wetlands and dams, and increases in sulfate and nutrients because of certain land uses such as mining, urban, and agricultural practices, contribute to this problem. The second was a public involvement, social impact segment. Its purpose was to inform and involve different groups of people interested in this research and to make recommendations on policies about mercury and eating fish. Suggested policy recommendations address watershed management practices to reduce methylmercury formation, and careful re-evaluation of the Alabama mercury standard used in issuing fish consumption advisories.

4:00 – 4:50 Session 11 & 12 Henderson or Seimann

Rogene F. Henderson, Ph.D.
Lovelace Respiratory Research Institute

USE OF A BATTERY OF BIOMARKERS TO ASSESS EXPOSURE

This research investigates the hypothesis that a battery of chemical-specific biomarkers with varying half-lives can more readily describe prior exposure to a specific chemical than a single biomarker. For example, one should be able to distinguish between a person who has had continuous, low-level exposure to a chemical from someone who has had a single, high-level exposure. In the first case, one would expect to find a build-up of markers with longer half-lives and only a low level of markers with shorter half-lives. In the second case, one would detect high levels of markers with short half-lives and very little of the markers with longer half-lives. A mathematical model will be used to relate the current levels of biomarkers to prior exposures to benzene – a toxic, airborne chemical contained in gasoline and car exhaust. A variety of exposure regimens will be conducted in mice to determine if the markers can distinguish between the different regimens.

Evan Siemann, Ph.D.
Department of Ecology and Evolutionary Biology
Rice University

CHINESE TALLOW INVASIONS INTO THE ENDANGERED COASTAL PRAIRIE: CAUSES AND CONSEQUENCES

Chinese Tallow Tree (*Sapium sebiferum*) is a major invader in the southeast United States that aggressively displaces native plants. Our research focuses on mechanisms that allow *Sapium* to become established in endangered coastal prairies and transform them into forests with limited animal and plant species. Our main objective is to understand how fire, fertility, and precipitation interact with herbivores to influence the likelihood, severity and impacts of *Sapium* invasions into coastal prairies. Results show that annual burning limits *Sapium* invasion while promoting diverse native plant and insect communities. On the other hand, higher fertility conditions accelerated woody plant invasion, indicating that manmade nitrogen inputs are likely to make management more challenging. To date, seedlings are not growing well in plots without water from extreme rainfall events, suggesting that invasions of Chinese Tallow Tree into coastal prairies could be less intense if extreme rainfall events become less frequent.

Seminar Information

Date: Wednesday, May 28, 2003

Time: 7:45 a.m. – 5:00 p.m.

Location: US EPA Region 6
1445 Ross Ave
12th Floor
Dallas, TX 75202

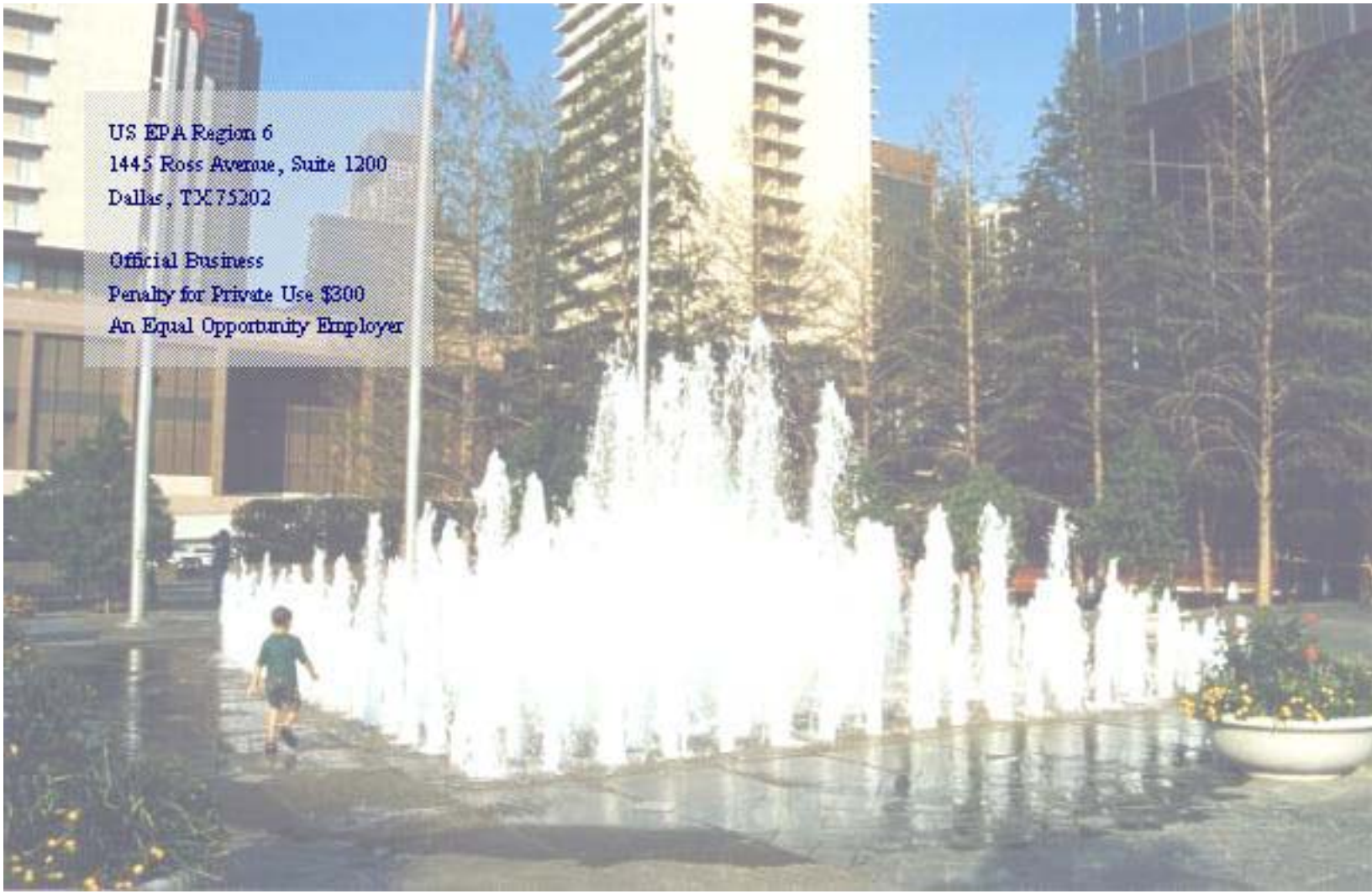
The following teleconference numbers are available for those not able to attend the seminar:

214-665-8100 (for the odd numbered sessions)
214-665-8101 (for the even numbered sessions)

For more information on this seminar please contact:
Troy Stuckey at 214-665-6432 or
Estella Waldman at 202-564-6836

View of Downtown Dallas

Special thanks to Dr. Mark J. Winter, creator of www.webelements.com, for granting permission for use of his hydrogen graphic in the logo of the Regional Science Council. We also want to thank Mr. John Roberts, creator of www.dallasarchitecture.info, for the wonderful pictures of Dallas.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